PortMaster Office Router Hardware Installation Guide

Livingston Enterprises, Inc.

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OR-M, OR-U

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Preface

About this Guide

This guide is designed to provide you with the information needed to install your new PortMaster™ Office Router. Specific information about using the PMconsole™ user interface to configure your PortMaster Office Router can be found in the *Administrator's Guide* for your interface. See "Related Documentation" for more information about Livingston Enterprises documentation.

This guide is designed to be used by qualified system administrators and network managers. Knowledge of basic networking concepts is required to successfully install your new PortMaster.

Preview of this Guide

The *PortMaster Office Router Hardware Installation Guide* includes the following chapters:

Chapter 1, "Overview" describes the PortMaster Office Router.

Chapter 2, "Preparing for Installation" provides pre-installation safety and device requirements, and describes tools and equipment required.

Chapter 3, "Installing the PortMaster Office Router" provides you with step-by-step instructions for the physical, electrical and online installation of the PortMaster Office Router.

Chapter 4, "Troubleshooting the Hardware Installation" provides guidance where difficulty may be encountered in installation.

The Appendices provide electrical and physical specifications, cabling specifications and modem requirements.

An index is also included.

Related Documentation

The PMconsole user interface is used to perform the actual configuration tasks. PMconsole comes in several versions including: PMconsole for Windows, PMconsole for X Windows, and the command line interface. Each interface has its own *Administrator's Guide*. Use the guide that is appropriate for your chosen interface.

The *Configuration Guide for PortMaster Products* provides an overview of networking and configuration issues related to the PortMaster series of products, for network administrators.

Document Conventions

The following table describes the type changes and symbols used in this guide.

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, parameters, and directories; on-screen computer output.	Use `version` to display the version number.
`AaBbCc123`	What you type, contrasted with on-screen computer output.	`login:` **`!root`** `Password:`
`AaBbCc123`	Command-line placeholder: replace with a real name or value.	To set baud rate, type: **`set s0 speed 2`** *`baud_rate`*
[AaBbCc123]	Commands in brackets denote a key to press.	`login:` **`!root`** **[Enter]**

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- By electronic mail, send mail to `support@livingston.com`
- By the world wide web, at `http://www.livingston.com/`
- Upgrades and new releases are available via anonymous FTP from `ftp.livingston.com`

Note – An Internet mailing list for PortMaster users is also available. To subscribe, send electronic mail to `portmaster-users-request@livingston.com` with `subscribe` in the body of the message.
The mailing list is also available in a daily digest format; to subscribe to that instead send electronic mail to `portmaster-users-digest-request@livingston.com` with `subscribe` in the body of the message.

Overview 1

The PortMaster Office Router provides dial-on-demand IP and IPX routing between Ethernet and either phone lines using a PCMCIA (Personal Computer Memory Card International Association) modem or external modem, or over an ISDN BRI. It is intended for use in remote offices or home networks where traffic does not justify the expense of a dedicated line. It has the same capabilities as the PortMaster 2, including full packet filtering capability.

The PortMaster Office Router comes with an Ethernet port (AUI or twisted pair), an RJ-45 port to connect a console or external modem, and either a PCMCIA modem slot (OR-M) or an ISDN BRI port (OR-U), and lifetime software support.

Figure 1-1 shows the PortMaster Office Router (OR-M) and Figure 1-2 shows the PortMaster Office Router (OR-U).

Figure 1-1 PortMaster Office Router (OR-M)

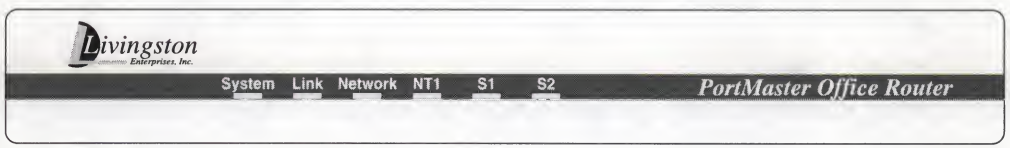

Figure 1-2 PortMaster Office Router (OR-U)

This installation guide contains hardware installation procedures. For configuration information, refer to the *Configuration Guide for PortMaster Products*.

Preparing for Installation 2

This chapter includes the following pre-installation topics: safety recommendations, general site requirements, cable requirements, power guidelines, modem requirements, as well as tools and equipment required.

Safety Recommendations

Warning – The PortMaster Office Router contains no user-serviceable parts. Therefore the chassis should never be opened.

When using the router, always follow these safety guidelines:

- Keep the chassis area clear and dust-free during and after installation.
- Disconnect all power before doing the following:
  - Connecting cables
  - Changing a PCMCIA modem
  - Changing a fuse
  - Installing or moving the unit
- Never assume power is disconnected from a circuit. Always check.
- Before applying power:
  - Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
  - Locate the emergency power-off switch for the room in which you are working.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

General Site Requirements

This section describes the requirements your site must meet for safe installation and unimpeded operation of the PortMaster Office Router. Prepare your site properly before beginning installation.

Site Environment

Choose a clean, dust-free and (preferably) air conditioned location. Avoid direct sunlight, proximity to heat sources, and areas with high levels of electromagnetic interference (EMI).

Chassis Accessibility

Select a location that provides front panel visibility, so that you can monitor the router LED indicators. Leave at least three (3) inches (8 cm) clearance at the rear of the router.

Cooling and Airflow

To prevent overheating, the operating environment for the router should not exceed 104°F (40°C). For proper airflow, allow at least three (3) inches (8 cm) clearance around the vent openings.

Power Guidelines

Before applying power, read the following power guidelines carefully:

- Inspect the router to verify that:
  - Cables are installed correctly
  - Ventilation is adequate
  - Power is coming from a building branch circuit
- Before you connect to a power source, verify that the source is properly grounded and falls within the (internal) power supply rating. The PortMaster Office Router operates correctly at any AC voltage from 100V to 260V and frequencies from 50 to 60 Hz.

Tools and Equipment Required

The PortMaster Office Router has no internal user-serviceable parts. It is possible, however, to change the fuse. A 3/16" flat-blade screwdriver is required to change the fuse.

Caution – Consult "Fuse" on page 3-4 before changing the router fuse.

Cable Requirements

The required cables for the PortMaster Office router are described in the following sections.

Appendix B, "Cabling Specifications," provides pinouts for the required cables.

Ethernet 10BaseT Cable

The Ethernet 10BaseT port accepts a modular RJ-45 connector. 10BaseT requires a minimum Category 3 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard. The distance limitation for 10BaseT is a maximum of 328 feet (100m).

Ethernet AUI Cable

The Ethernet AUI port accepts a standard AUI cable with a DB-15 female connector.

PCMCIA Cable

The PCMCIA slot accepts a Type-2 PCMCIA modem card. The PCMCIA modem generally comes with a cable to connect to a wall jack.

Console Cable

The router comes with an RJ-45 to DB-25 female cable for connecting the serial port on a PC to the S0 (asynchronous serial) port on the PortMaster. You may also connect a standard ASCII terminal or an external modem to this port with a DB-25 null modem adapter.

Note – To connect to a PC serial port, a 25-pin to 9-pin serial adapter may be required. To connect to a terminal, a male-to-male gender changer is required. Neither the adapter nor the gender changer are included with the router.

ISDN BRI Cable

The OR-U has an RJ-45 connector for an ISDN BRI with integrated NT1, providing a U interface in countries that follow USA telephone standards.

Modem Requirements

The PortMaster Office Router can use a PCMCIA Type-2 modem provided by the customer.

Appendix C, "Modems," contains a list of verified PCMCIA modems and configuration guidelines for other modems.

Installing the PortMaster Office Router 3

Caution – Before you install the PortMaster Office Router, read Chapter 2, "Preparing for Installation."

This chapter includes the following installation topics: a list of components, desktop installation, overview of front panel LEDs, overview of rear panel connectors and DIP switches, connecting to the network, and configuring the PortMaster Office Router.

Desktop Installation

For desktop installation, place the PortMaster Office Router on a desktop, bookshelf or other flat secure surface. Your location should provide:

- A clear view of the front-panel LEDs.
- Clearance of three (3) inches (8 cm) for cabling and airflow.

Overview of Front Panel LEDs

Figure 3-1 shows the front-panel LEDs for the Office Router model OR-M. Figure 3-2 shows the front-panel LEDs for the model OR-U. LEDs are described in Table 3-1. Use the LED descriptions to verify proper operation.

Figure 3-1 PortMaster Office Router—Front-Panel LEDs (OR-M)

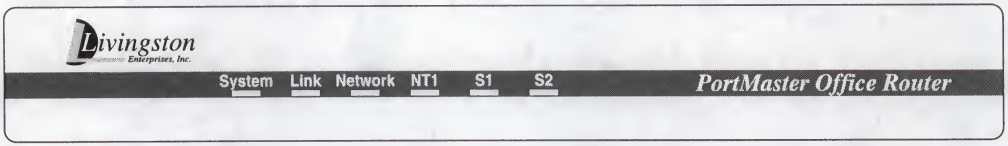

Figure 3-2 PortMaster Office Router—Front-Panel LEDs (OR-U)

Table 3-1 Front-Panel LED Descriptions

LED	Description
System	This LED provides three types of diagnostic information: • During initial hardware self-test, the LED blinks three times per second, then once per second. • After the power-on self-test is successfully completed, and while the operating system is loading, the LED blinks at one-second intervals. • When the system is fully operational, the LED remains on, blinking off once every five seconds.
Link	This LED is on when the system has link integrity to a 10BaseT hub.
Network	This LED blinks to indicate Ethernet traffic. During heavy traffic, this light may appear solid, due to the rapidity of its blinking.
NT1 (OR-U only)	When you first turn power on, this LED blinks 8 times a second for about one second while performing an internal self-test of the NT1. If this does not occur, contact Livingston Technical Support. If no SPID is set on the port and there is no circuit to the telephone company, the LED goes off. If no SPID is set on the port but there is a circuit to the telephone company, the LED will blink once per second. If there is a valid SPID and a circuit the LED blinks once per second while synchronizing with the telephone company, then becomes solid.

Table 3-1 Front-Panel LED Descriptions

LED	Description
S1 (OR-U only)	This LED is on when ISDN port S1 has an established connection.
S2 (OR-U only)	This LED is on when ISDN port S2 has an established connection.

Overview of Rear Panel Connectors and DIP Switches

The rear panel of the PortMaster Office Router provides (left to right): a power switch, a user-serviceable fuse, an AC power receptacle, an Ethernet 10BaseT port, an Ethernet AUI port, a PCMCIA modem slot (S1) or ISDN BRI port (S1-S2), a three-section DIP switch, and a serial console port (S0). Figure 3-3 shows the Office Router OR-M back panel. Figure 3-4 shows the OR-U back panel.

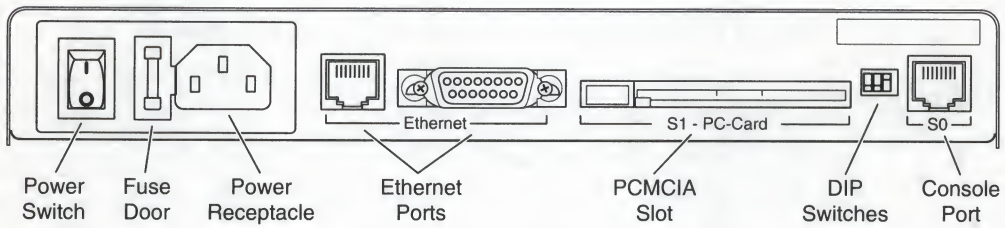

Figure 3-3 PortMaster Office Router—Rear Panel Connectors (OR-M)

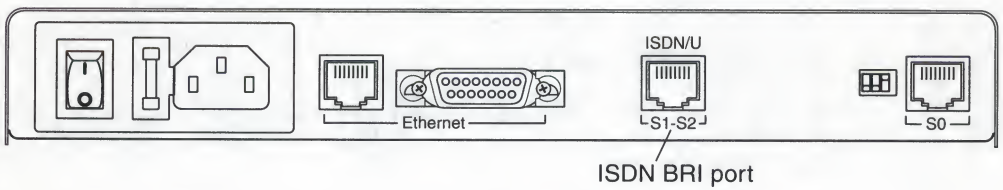

Figure 3-4 PortMaster Office Router—Rear Panel Connectors (OR-U)

Power Receptacle

AC power to the PortMaster is connected using a standard power cable. The PortMaster uses an auto-sensing, auto-ranging power supply that automatically adjusts to match the input voltage without setting a switch. The PortMaster operates correctly at any AC voltage from 100V to 260V and frequencies from 50 to 60 Hz.

Caution – Before you apply power, refer to "Safety Recommendations" on page 2-1 and "Power Guidelines" on page 2-2.

To apply power:

1. **Attach the power cord to the router and to a properly grounded electrical outlet.**
2. **Set the power switch to the ON position.**

To disconnect power:

1. **Set the power switch to the OFF position.**
2. **Detach the power cord from the outlet and the router.**

Fuse

The only user-serviceable part on the router is its fuse, which can be replaced. To change a fuse:

1. **Switch the power switch to the OFF position.**
2. **Detach the power cord from the router.**
3. **Insert a 3/16" flat-head screwdriver between the fuse door and the chassis and gently pry the door open, as shown in Figure 3-5.**
4. **Replace the 250V, 2A fuse.**

   The fuse is easily removed and replaced and has no "wrong end."
5. **Press the fuse door shut until it clicks.**
6. **Reattach the power cord to the router.**
7. **Set the power switch to the ON position.**

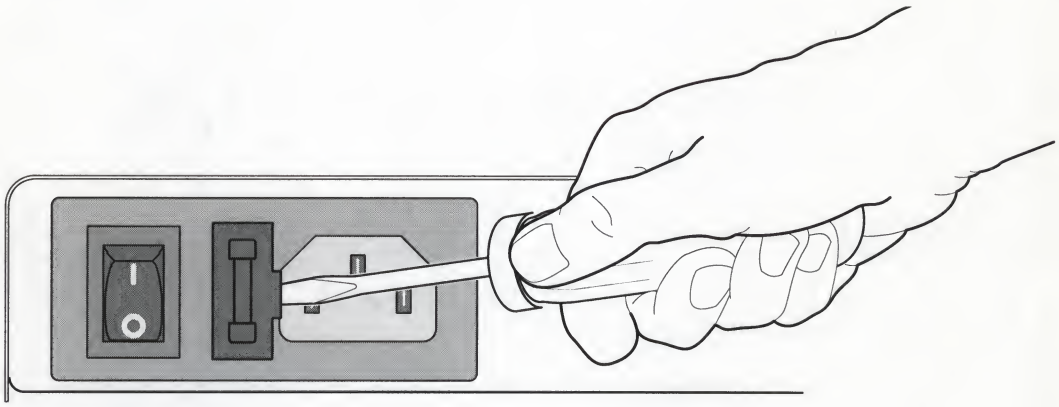

Figure 3-5 PortMaster Office Router—Changing the Fuse

Ethernet 10BaseT Port

The Ethernet 10BaseT port allows you to connect your PortMaster Office Router to a network 10BaseT hub using a straight-through configured twisted-pair cable with RJ-45 connectors. In order to connect to a 10BaseT network, DIP switch #3 must be UP.

Ethernet AUI Port

The Ethernet AUI port allows you to connect your PortMaster Office Router to a 10Base5, 10Base2 or 10BaseT transceiver using a straight-through cable with DB-15 connectors. In order to connect using the AUI port, DIP switch #3 must be DOWN.

PCMCIA Modem Slot

The router is preconfigured to accept and communicate using most Type-2 PCMCIA modems. For a list of verified PCMCIA modems, see Appendix C, "Modems."

To install a PCMCIA modem:

1. **Set the power switch on the router to the OFF position.**
2. **Insert a Type-2 PCMCIA modem into the slot until it clicks into place.**

   PCMCIA modems are physically keyed to ensure that they are installed correctly; however, the correct side must be facing upward. If you are unsure which side is up, refer to the manufacturer's documentation.

3. **Set the power switch on the PortMaster to the ON position.**

To remove a PCMCIA modem:

1. **Set the power switch on the router to the OFF position.**
2. **Push the eject button to the left of the PCMCIA slot.**

ISDN BRI Port

The ISDN port has a female RJ-45 connector, for a BRI with integrated NT1, providing a U interface.

This port attaches directly to an ISDN line from the telephone company, which uses two wires from an RJ-45 connector to provide two 64Kbps B channels plus one 16Kbps D channel for signalling. It supports two 64Kbps connections, and corresponds to two ports (S1-S2).

Three-Section DIP Switch

The PortMaster Office Router has a three-section Dual Inline Package (DIP) switch, shown in Figure 3-6:

- The left switch (DIP switch #1) controls the diagnostic mode.

  When UP, the router boots in diagnostic mode. When DOWN, the router boots in normal mode. Default is DOWN. For information about the diagnostic mode, refer to "Diagnostic Boot Sequence" on page 4-4.
- The middle switch (DIP switch #2) controls the boot mode.

  When UP, the router boots from the network using RARP and TFTP. When DOWN, it boots from internal flash memory. Default is DOWN.

  For more information about using TFTP to boot the router, refer to the *Configuration Guide for PortMaster Products.*
- The right switch (DIP switch #3) selects the Ethernet network type.

  When UP, the router connects through the 10BaseT Ethernet port. When DOWN, it connects through the AUI Ethernet port. Default is DOWN.

Warning – When changing the position of DIP switch #3, power must be off.

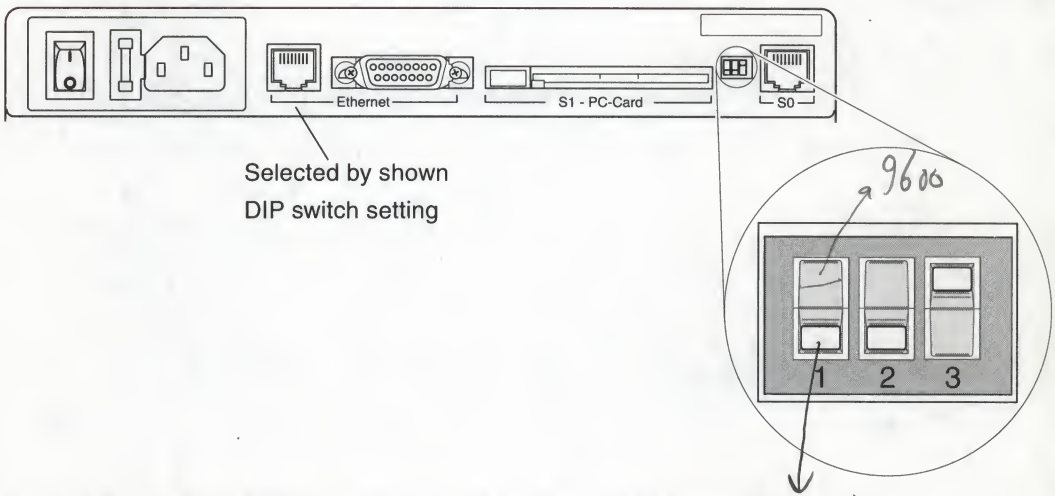

Figure 3-6 PortMaster Office Router—Rear-Panel DIP Switches

As shown in Figure 3-6, DIP switch #3 is UP, selecting the 10BaseT port for connection to the Ethernet.

Serial Port (S0)

The S0 port connects to a PC serial port using the supplied cable. You may connect a standard ASCII terminal to this port with a DB-25 null modem adapter. You may connect an external modem to this port with a straight-through cable.

When in normal mode (DIP switch #1 DOWN), the S0 port supports communications at up to 115,200 bps. In diagnostic mode (DIP switch #1 UP), the router sets the S0 port to 9600 bps, 8 data bits, no parity, 1 stop bit.

Note – To connect to a PC serial port, a 25-pin to 9-pin serial adapter may be required. To connect to a terminal, a male-to-male gender changer is required. Neither the adapter, nor the gender changer, are included with the router. For cabling specifications, refer to Appendix B, "Cabling Specifications."

Connecting to the Network, Phone Line and Console

Follow these instructions to connect the PortMaster Office Router to a network, a telephone wall jack, and a console (PC serial port or ASCII terminal). See Figure 3-7.

The OR-U accepts an ISDN line directly and has no PCMCIA card.

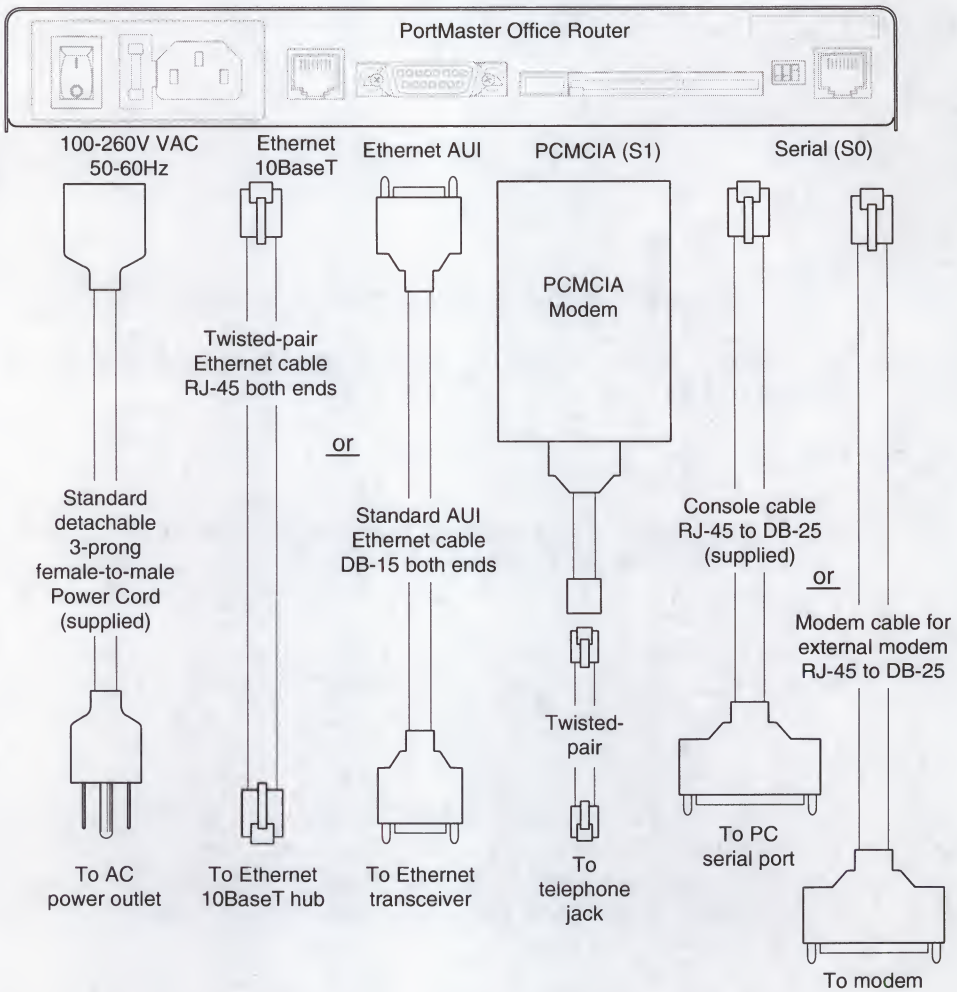

Figure 3-7 PortMaster Office Router—Rear View, with All Connectors and Corresponding Cables and Cords

The following procedure walks you step-by-step through the installation of the PortMaster Office Router.

1. **Set the power switch on the router to the OFF position.**
2. ***OR-M:* Insert a Type-2 PCMCIA modem into the slot until it clicks into place.**

   PCMCIA modems are physically keyed to ensure that they are installed correctly; however, the correct side must be facing upward. If you are unsure which side is up, refer to the manufacturer's documentation. The PCMCIA modem does not come with the router. For a list of verified modems, see Appendix C, "Modems."
3. ***OR-M:* Connect the modem cable supplied with your PCMCIA modem to the modem and to an *analog* telephone wall jack.**
   ***OR-U:* Connect the ISDN line to the RJ-45 port with a cable.**

   The OR-U comes with an RJ-45 to RJ-11 cable.
4. **Attach the RJ-45 end of the supplied serial cable to router port S0 and the DB-25 end of the cable to the serial port of a PC or ASCII terminal.**

   To connect to a PC serial port, a 25-pin to 9-pin serial adapter may be required. To connect to a terminal, a male-to-male gender changer is required. Neither the adapter, nor the gender changer, are included with the router.

Warning – Before you apply power, refer to "Safety Recommendations" on page 2-1 and "Power Guidelines" on page 2-2.

5. **Attach the power cord to the router and to a properly grounded electrical outlet.**
6. **Connect the 10BaseT or AUI Ethernet port on the PortMaster Office Router on an Ethernet hub or transceiver, using the appropriate cable. For information on switching between DIP switch settings for Ethernet, see "Overview of Rear Panel Connectors and DIP Switches" on page 3-3.**

   The Ethernet cable does not come with the router.
7. **Set the power switch to the ON position.**
8. **Verify that the System LED is active.**

   While the router is booting, the LED blinks three times per second, then once per second. The LED blinks OFF once every five seconds during normal operation. If the System LED does not behave in this way, see "Hardware Problems and Solutions" on page 4-1.
9. **Verify that the Link LED is ON.**

The Link LED blinks on once for AUI and twice for 10BaseT. Solid ON indicates 10BaseT link integrity exists. Solid OFF indicates link error for 10BaseT. Link LED is not used for AUI. If the Link LED does not behave in this way, see "Hardware Problems and Solutions" on page 4-1.

10. **Verify that the Network LED is ON when Ethernet traffic is present.**

    The Network LED blinks on once for every packet transmitted or received. In heavy traffic situations, the LED may appear solid. If the Network LED does not behave in this way, see "Hardware Problems and Solutions" on page 4-1.

11. **Once the router has booted and all connections are verified, the console (PC or terminal) displays a login prompt:**

```
login:
```

12. **Enter the address of the Ethernet interface.**

    a. If you are entering an IP address, type the following, pressing [Enter] after each line. Replace the italicized values with the values for your network:

```
login:    !root
Password: [Enter]
Command>  set ether0 address 172.168.200.1
Command>  save all
Command>  quit
```

    b. If you are entering an IPX address, type the following as well:

```
Command>  set ether0 ipxnet AFAF0808
Command>  set ether0 ipxframe ethernet_802.2
Command>  save all
Command>  quit
```

13. **If you are planning to use the command prompt interface to configure your router, you can do so now. If you are planning to use PMconsole to configure your router, you can disconnect the terminal from the S0 port now.**

    For configuration information, consult the *Configuration Guide for PortMaster Products*. PMconsole can be used to configure all PortMaster products. PMconsole is available for Windows and many UNIX platforms. Once you have decided which interface to use, refer to the *Administrator's Guide* for that interface.

Troubleshooting the Hardware Installation 4

This chapter includes the following troubleshooting topics: hardware problems, solutions, and the boot sequence in diagnostic mode.

Hardware Problems and Solutions

Hardware problems during installation can be identified by certain LED indications. Table 4-1 identifies these behaviors, the likely cause, and the likely solution. If the solution requires contacting Livingston Technical Support, refer to page xiii in the Preface for contact information. For behavior of the ISDN LEDs on the OR-U refer to Table 3-1 on page 3-2.

Table 4-1 Hardware Problems and Solutions

LED Indication	Likely Cause	Solution
System LED fails to light	Lack of power.	Check power switch, power cable, outlet, and fuse.
During power-on, the System LED fails to light, becomes solid ON, or becomes stuck at blinking three times per second.	Hardware problem.	Contact Livingston Technical Support.
During power-on, the System LED continues blinking once per second for more than a minute	DIP switch #2 UP and no boot server.	If you have no boot server, verify that DIP switch #2 is in the DOWN position; otherwise, see the "Network Booting" procedure in the *Configuration Guide for PortMaster Products*.
	Flash RAM contents corrupt.	Follow the *Configuration Guide for PortMaster Products* procedure for "Network Booting" and rewriting the contents of Flash RAM.

Table 4-1 Hardware Problems and Solutions *(Continued)*

LED Indication	Likely Cause	Solution
Immediately after booting, the System LED becomes stuck at solid ON or solid OFF.	Flash RAM problem.	Contact Livingston Technical Support.
During operation, the System LED becomes stuck at solid ON or solid OFF.	Hardware failure (possibly caused by an external device).	If still solid ON or OFF after removing all external devices (except the diagnostics terminal), contact Livingston Technical Support.
No console login prompt.	Incorrect terminal settings, bad connection, or bad cable.	Verify that cable is plugged into S0. Verify terminal settings of 9600, 8N1. Verify DIP switch #1 is UP. Verify that you have a working null modem cable and that it is properly connected at both ends. See Appendix B, "Cabling Specifications."
Link LED is solid OFF.	If you are connected to an AUI Ethernet transceiver, this is not a problem.	
	If you are connected to a 10BaseT Ethernet hub, you do not have link integrity.	Verify that DIP switch #3 is UP (for 10BaseT), that you have a working 10BaseT cable, and that it is properly connected at this end and at the hub.

Table 4-1 Hardware Problems and Solutions *(Continued)*

LED Indication	Likely Cause	Solution
Network LED is solid ON.	If traffic is heavy, this is only an illusion.	
	If no packets are being passed, you may have an incorrectly cabled network.	Verify correct network cabling.
Network LED is solid OFF.	If there is no traffic, this is normal. If packets cannot be passed, you may have an incorrectly cabled network.	Verify correct network cabling.
Port S1 does not appear during configuration of the PortMaster Office Router OR-M.	PCMCIA modem not seen by router at power on.	Turn power off, insert PCMCIA modem card (consult manufacturer's documentation to ensure that the correct side is up), then turn power on.
Undefined difficulty with power-up and you are not able to isolate the problem by observing LED behavior.	Unknown	Power up in Diagnostic Mode. For information about diagnostic mode, see "Diagnostic Boot Sequence" on page 4-4. If the displayed diagnostics do not suggest a solution, record the information and contact Livingston Technical Support.

Diagnostic Boot Sequence

If you are having difficulty with booting and are unable to isolate the problem by observing LED behavior, you may wish to boot in diagnostic mode, as follows:

1. **Set the power switch on the router to the OFF position.**
2. **Set the terminal to 9600 baud, 8 data bits, no parity, 1 stop bit, software flow control (Xon/Xoff).**
3. **Move the left DIP switch (#1) to the UP position.**
4. **Attach a terminal or PC to the console port (S0) using a null modem cable.**

   Refer to Table B-1 in Appendix B for cable pinouts.

Caution – Before you reapply power, refer to "Safety Recommendations" on page 2-1 and "Power Guidelines" on page 2-2.

5. **Switch the power switch to the ON position.**
6. **Observe the boot diagnostics displayed on the console screen. See Figure 4-1 for a sample boot screen in diagnostic mode and Table 4-2 for a description of displayed messages.**

   Figure 4-1 is for an OR-M. The OR-U is similar, but will display a message for the ISDN port instead of the PCMCIA slot

```
Livingston Enterprises, Inc. Boot Prom Rev K

Testing Low Memory ....
Testing System Clock ....
Testing System Memory .... A000
Checking Boot Rom ....
Starting FLASH Boot .....
Booting From Flash Type Am29F040
Loading Image at 0fff0000
320112 flash copy complete
Verifying Load Module Checksum ...
Starting Load Module ...
Testing High Memory ... . 1024K
PCMCIA slot ..... PCMCIA card type
Found 2 ports ....
Running ComOS ...
PortMaster Console login:
```

Figure 4-1 PortMaster Office Router—Diagnostic Boot Screen

Table 4-2 Interpreting the Diagnostic Boot Screen

Field	Possible Message	What it Means
Boot Prom Rev	K	Version number of the boot prom installed
Testing Low Memory	ERROR	Message only on failure. Record all information to this point and contact Livingston Technical Support.
Testing System Clock	ERROR	Message only on failure. Record all information to this point and contact Livingston Technical Support.
Testing System Memory	ERROR at *failed memory address*	Message only on failure. Record all information to this point and contact Livingston Technical Support.

Table 4-2 Interpreting the Diagnostic Boot Screen *(Continued)*

Field	Possible Message	What it Means
Checking Boot Rom	ERROR	Message only on failure. Record all information to this point and contact Livingston Technical Support.
Starting FLASH Boot	N/A	N/A
Booting from FLASH Type	`Am29F040`	Flash brand name
Loading Image at	`0fff0000`	RAM Address
flash copy complete	`320112`	Counter for Flash bytes transferred to RAM. If the counter freezes, record all information to this point and contact Livingston Technical Support.
Verifying Load Module Checksum	Invalid Length for Flash at *`RAM address`*	Message only on failure. Record all information to this point and contact Livingston Technical Support.
Starting Load Module	N/A	N/A
Testing High Memory	ERROR at *`failed memory address`*	Message only on failure. Record all information to this point and contact Livingston Technical Support.
PCMCIA slot	*`PCMCIA card type`*	PCMCIA card type
Found 2 Ports	`1, 2, 3`	Note that S0 is one port, PCMCIA is another. The BRI counts as two ports.
Running ComOS	Running ComOS	If system hangs at this point and does not print the next message, the configuration flash memory has been corrupted. Refer to "Troubleshooting" in the *Configuration Guide for PortMaster Products.*
PortMaster Console login:	N/A	System up and running.

Physical Specifications A

This appendix includes the physical, electrical/electronic, and environmental specifications for the PortMaster Office Router.

Physical Specifications

Table A-1 provides physical specifications for the PortMaster Office Router.

Table A-1 Physical Specifications

Description	Design Specifications
Dimensions (HxWxD)	1.75" x 10.5" x 8.75" (4.3cm x 26.2cm x 22cm)
Weight	3.9 lb (1.8 kg)
PCMCIA Interface (OR-M only)	Type-2 (data rates up to 115,200 bps)
Ethernet Interface	10BaseT (RJ-45) or AUI (DB-15)
Async Serial Interface	EIA/TIA-232/423 (RJ-45) (data rates up to 115,200 bps)
ISDN Interface (OR-U only)	RJ-45 BRI with integrated NT1 (U interface), providing two 64Kbps B channels.

Electrical/Electronic Specifications

Table A-2 provides electrical/electronic specifications for the PortMaster Office Router.

Table A-2 Electrical/Electronic Specifications

Description	Design Specifications
Input Voltage	110 VAC +/-10%, 47 to 63 Hz, 1.0A 220 VAC +/-10%, 47 to 63 Hz, 0.6A
Power Dissipation	10 Watts
Memory	1MB RAM, 512KB NVRAM

Environmental Specifications

Table A-3 provides environmental specifications for the PortMaster Office Router.

Table A-3 Environmental Specifications

Description	Design Specifications
Operating temperature	32 to 104°F (0 to 40°C)
Storage temperature	-40 to 185°F (-40 to 85°C)
Operating humidity	10 to 90%, noncondensing

Cabling Specifications B

This appendix describes pinouts for the port S0 console cable and modem cable.

Console Cable

The serial port (S0) is an EIA/TIA-232 (RS423-compatible) interface. Connect a PC serial port or ASCII terminal to this port to configure the router. A console cable is supplied with the PortMaster Office Router, or can be ordered from Livingston Enterprises using product code CBL-CDB45. It has a female DB-25 connector. The pinout is described in Table B-1.

To connect to a PC serial port, a 25-pin to 9-pin serial adapter may be required. To connect to a terminal, a male-male gender changer is required. Neither adapter is included with the router.

Table B-1 S0-to-Console Serial Cable

PortMaster Office Router Serial Port (S0)				**PC or Terminal Serial Port**	
RJ45	**Name**	**Definition**	**Direction**	**DB-25 (DTE)**	**Signal**
1	RTS	Request to Send	->	5	CTS
2	DTR	Data Terminal Ready	->	8[1]	DCD
3	TXD	Transmit Data	->	3	RXD
4	GND	Signal Ground		NC[2]	
5	GND	Signal Ground		7	GND
6	RXD	Receive Data	<-	2	TXD
7	DCD	Data Carrier Detect	<-	20	DTR
8	CTS	Clear to Send	<-	4	RTS
NC		Data Set Ready		6[1]	DSR

1. Pins 8 and 6 in the DB-25 are connected internally.
2. Not connected

Modem Cable

Use a modem cable to connect an external modem to the S0 port on the router. This cable can be ordered from Livingston Enterprises using Product Code CBL-MDB45. This cable is included with the Office Router, and has a male DB-25 connector. Pinouts are described in Table B-2.

Table B-2 S0-to-Modem Cable

PortMaster Office Router S0 (serial) Port				**External Modem**
RJ45	**Name**	**Definition**	**Direction**	**DB-25 (DCE)**
1	RTS	Request to Send	->	4
2	DTR	Data Terminal Ready	->	20
3	TXD	Transmit Data	->	2
4	GND	Signal Ground		NC
5	GND	Signal Ground		7
6	RXD	Receive Data	<-	3
7	DCD	Data Carrier Detect	<-	8
8	CTS	Clear to Send	<-	5

Modems C

The PortMaster Office Router OR-M supports two types of modems, a PCMCIA Type-2 modem in the PCMCIA slot (S1), and an external modem connected to the S0 port. The OR-U can use an external modem connected to the S0 port.

PCMCIA Modems

The PCMCIA modems in Table C-1 have been verified for use with the PortMaster Office Router. They are listed alphabetically by manufacturer.

Table C-1 Verified PCMCIA Type-2 Modems

Manufacturer	Model	Speed
DSI	Scout 144DF	14.4/V.32bis
Hayes	Optima 14.4	14.4/V.32bis
Intel	Satisfaction	14.4/V.32bis
Newcom	14,400pcm	14.4/V.32bis
Practical	PC288T2-EZ	28.8/V.34bis
Premax	PCMCIA 14.4	14.4/V.32bis
TDK	DF1414	14.4/V.32bis
US Robotics	Sportster Sportster 28.8 Courier 28.8	14.4/V.32bis 28.8/V.34 28.8/V.34
ZOOM	ZPCMCIA 14.4C	14.4/V.32bis

External Modems

Most external modems operate with the PortMaster Office Router.

Modem Tips

Livingston recommends any reputable vendor of V.32bis or V.34 modems. For best results, the modem should be configured as follows:

- Lock DTE rate at 115.2k or as high as the modem can operate reliably
- Raise DCD when it senses carrier (usually &C1)
- Reset itself when DTR is dropped (usually &D3, sometimes &D2)
- Use hardware flow control (RTS/CTS)
- For use with dial in, set s0=1 which answers the phone on the first ring

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